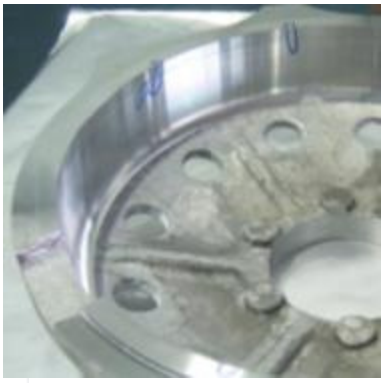
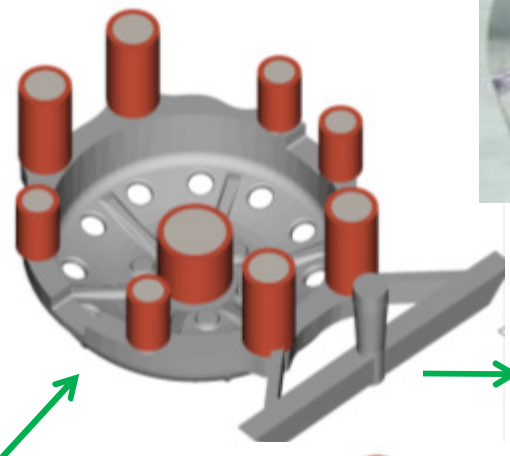
Bell Housing

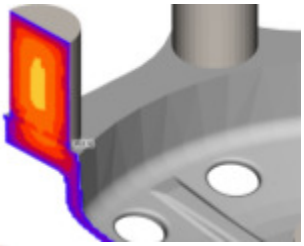
Cast Steel, Green Sand Casting

A steel bell housing casting of overall size 600 mm x 550 mm x 150 mm weighing 55 kg was produced by sand casting process. This item suffered from cracks in the inside rim region, discovered after machining. Most of these castings could be repaired, though at additional cost.

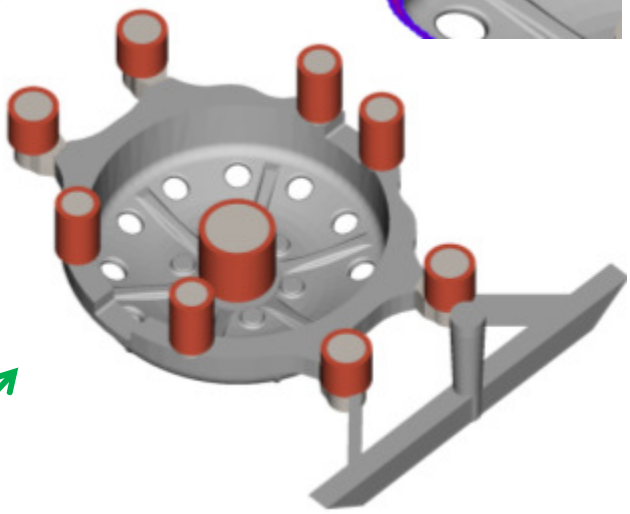


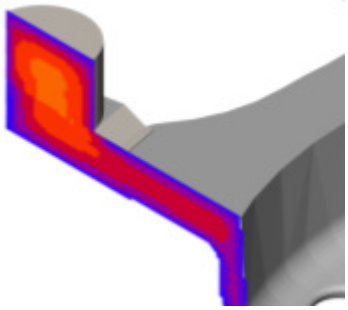
Thickness analysis of the part in a cross section through the ear portion of the rim clearly shows a L-junction with a rapid change of thickness, a cause for stress concentration.





The original methods design included top feeders on the rim, and a large central feeder. Simulation shows that the rim area has high temperature owing to the feeder, and also high temperature gradient due to thickness change. These three conditions together indicate a strong possibility for hot tear, as observed in the actual casting.





The four top feeders in the affected area are replaced with side feeders. Simulation show a relatively less temperature gradient, reducing the possibility of hot tear. Implementation of the new methods reduced hot tears by more than 50%, and also slightly improved the yield.